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The purpose of this study was to determine if there were any systematic differences in intellective factors between graduates and non-graduates in the associate degree programs that may be useful for improving the selection process. Ten predictor and eight criterion variables were measured for all associate degree freshman classes at the college for the years 1959 through 1963. Total number of subjects was 328. Predictor data were collected from the Admissions and Counseling records of the subjects and criterion data were collected from the subjects' transcripts. Descriptive statistics were calculated and t-tests run comparing graduates with non-graduates. A series of regression problems were also run. Findings revealed that the best predictor of the percentage of a given class who will graduate in six terms was the first-term GPA. The overall increase in mean GPA between first and sixth terms was attributed to the poor achievement and resultant dropping-out of non-graduates by the end of their freshman year. An optimum subset of four intellective variables for predicting three achievement criteria was determined by regression analyses. If entrance requirements are increased and instructional and grading practices remain the same, a higher proportion of entering freshmen should be graduated, while the probability is increased of rejecting applicants who would have graduated if admitted. Such problems must be faced under any selective system of admission and final decisions are dictated by school admissions philosophy. (RM)

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The Pennsylvania State University
York Campus

Student Affairs Research

The Role of Intellective Variables in Achievement and Attrition of Associate Degree Students at the York Campus for the Years 1959 to 1963

Report 68-7

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The Role of Intellective Variables in Achievement and Attrition of Associate Degree Students at the York Campus for the Years 1959 to 1963

Edward M. Elias and Carl A. Lindsay

The present study is addressed to an examination of the validity of the intellective variables used in admitting students to the two-year associate degree programs at The Pennsylvania State University, and also some of the variables used in the counseling program. The primary purpose is to determine if there are any systematic differences in intellective factors between graduates and non-graduates in the associate degree programs which may be useful for improving the selection process.

Method

Measures Employed

Ten predictor and eight criterion variables were used in the study. A description of the variables follows.

Predictor Variables

1-5. The Pennsylvania State University Academic Aptitude Examination (Moore-Castore, 1947). A general measure of scholastic aptitude. It is composed of four sub-tests: Vocabulary, Paragraph Reading, Arithmetic, and Algebra, used as individual predictors, and a four-part total score, also used as a predictor.

6. The English Placement Examination (Bowman, Patterson, & Sandin, 1949), a measure of proficiency in essential English usage. This test also consists of four sub-tests: Spelling, Vocabulary, Punctuation, and Grammar. The four-part total score was used as a predictor.

7. First Term Predicted Grade Point Average (PGPA). A linear estimate

of a student's most probable first term GPA based on a weighted average of high school rank and Moore-Castore total score.

8. High School Rank (HSR). A student's graduating rank in high school expressed in quintiles, where 1 = first fifth, 2 = second fifth, etc.

9. Units of HS Math. The number of Carnegie Units of mathematics scheduled in high school.

10. Size of HS Class. The number of graduating seniors for a given high school.

Criterion Variables

Seven of the variables were an index of the student's scholastic achievement in college and the eighth variable was a dichotomous classification, indicating whether or not a student had been graduated at the end of six academic terms of enrollment. Term Grade Point Averages (GPA) on a four-point scale where A = 4, B = 3, C = 2, D = 1, and F = 0, were obtained at the following terms: (a) first term, (b) third term, (c) fourth term, and (d) sixth term. The cumulative GPA (CGPA) was also obtained at the end of the third, fourth, and sixth terms.

Subjects

The entire associate degree freshman classes at the York Campus of the Pennsylvania State University for the years 1959 (N = 79), 1960 (N = 60), 1961 (N = 80), 1962 (N = 43), and 1963 (N = 66) comprised the subject (Ss) population. To provide more stable estimates of the associate degree population parameters, the five entering classes were combined into two groups. Group A consisted of freshmen for the years 1959, 1960, and 1962 (N = 182); Group B of freshmen for the years 1961 and 1963 (N = 146). Groups A and B were further sub-divided into graduates and non-graduates.

Procedure

Predictor data were collected from the Admissions and Counseling records of the Ss. Criterion data were collected from the Ss' transcripts.

Data Analysis

A number of analyses were carried out on the predictor and criterion data. Descriptive statistics (means and standard deviations) were calculated on all variables for each of the five entering classes. Also for each class the percentage of the entering class enrolled at selected points and the percentage who were graduated at the end of six terms were developed. For Groups A and B, an intercorrelation matrix of the predictor and criterion variables was developed. Also, for Groups A and B, descriptive statistics were calculated and t-tests run comparing graduates with non-graduates. Finally, a series of regression problems to determine the optimum set of predictor variables for predicting (a) first term GPA, (b) third term cumulative GPA, and (c) sixth term CGPA were run, based on the correlation data for Group A.

Results and Discussion

Descriptive Data

Shown in Appendix A are descriptive statistics for the five successive associate degree freshman classes at the York Campus. There is a general upward trend in mean aptitude scores (Moore-Castore) over the five-year period. The increase is on the order of 11 points, about one-half of a standard deviation. A similar increase in aptitude was noted for all baccalaureate degree students over this period (Lindsay & Ziegler, 1962). Unfortunately, mean aptitude scores for all associate degree students are not available, so that a comparison of York associate degree students with entire Penn State associate degree population cannot be made.

There is no definite trend in the other predictor variables over the five year period. However, a very slight increase in mean HSR, English Placement Total Score and units of high school math is observed when the classes of 1959 and 1963 are compared. Mean PGPA shows some fluctuations over this period with an overall mean of approximately 2.00.

The percentage of freshmen who graduate in six terms over the five year period shows some marked fluctuations. While nearly 62 percent of the Class of 1960 were graduated, only 41 percent of the Class of 1961 did so in six terms. The mean percentage of graduates for the five year period is about 48 percent.

The best predictor of the percentage of a given class who will graduate in six terms appears to be the first term GPA. The Class of 1960, which graduated almost 62 percent of its entering members, had a mean first term GPA of 2.37. On the other hand, the remaining four classes, which graduated about 45 percent of their members, had significantly lower first term GPA's on the order of 1.95. Correlation data also support this contention. The correlation between first term GPA and sixth term cumulative GPA is on the order of .75 (See Appendix C and Appendix D). This relatively high correlation indicates that the rank-ordering of students by GPA does not change substantially between the first and sixth terms. In other words, students who achieve a high first term GPA, tend also to achieve a high sixth term GPA, and conversely.

All classes show an increase in mean GPA between the first and sixth terms. The increase is primarily due to the fact that non-graduates tend to be poor achievers and they tend to drop out of school by the end of their freshman year. For example, the mean first term GPA of Group A graduates was 2.48 while the same GPA for non-graduates was only 1.54.

Graduates also show an increase in mean GPA between their first and sixth terms which accounts for the remaining increase. Group A graduates had a first term GPA of 2.48 and their sixth term cumulative GPA was 2.61.

Predictor Variable Validities

Zero order correlations between the nine predictor variables and selected achievement criteria for Groups A and B are given in Table 1. As would be expected, the two best predictors of achievement are HSR and aptitude scores. And since the correlations shown are based on two independent samples, the best estimate of the correlations for the population of interest (all associate degree students) is the average of the correlations for Groups A and B. Thus, HSR correlates on the order of .40 with first term GPA and about .45 with third term GPA, while aptitude scores correlate about .43 and .28 with these two criteria. The best predictor of achievement is PGPA ($r = .50$ with first term GPA; $r = .48$ with third term CGPA).

Generally speaking, all of the intellective variables show a low to moderate correlation with all of the criteria. The two-non-intellective variables (units of high school math and size of high school class) are rather poor predictors of achievement.

It is not unusual to find correlations on the order of .40 between past performance (HSR) and first or third term GPA. But it is rather surprising to find correlations of that magnitude between HSR and a longer-range criterion of graduation average. As will be pointed out subsequently in more detail, these data indicate that intellective factors can predict, with a fair degree of accuracy, subsequent achievement.

Graduates and Non-Graduates Compared

The question of whether or not the predictor variables selected can differentiate between graduates and non-graduates is answered by the data

Table 1

Comparative Validities of Selected Predictors
for York Campus Group A and Group B[1]

Predictors	Criteria									
	1st Term GPA		3rd Term Cum. GPA		4th Term Cum. GPA		6th Term Cum. GPA		Grad/ Non-Grad	
HSR[a]	44	(35)	54	(40)	54	(45)	49	(35)	28	(28)
Engl. Pl. 4-pt.	36	(34)	28	(25)	12	(33)	01	(32)	24	(22)
--Moore-Castore-- Voc.	15	(26)	14	(11)	00	(14)	06	(16)	02	(12)
Para. Read.	27	(31)	20	(23)	13	(28)	02	(25)	13	(22)
Arith	34	(58)	23	(40)	22	(44)	22	(47)	14	(32)
Algebra	35	(55)	17	(43)	03	(45)	05	(40)	14	(25)
4-pt.	32	(53)	24	(33)	09	(35)	08	(35)	11	(29)
PGPA	49	(63)	44	(51)	28	(40)	24	(58)	08	(00)
Units of HS Math	30	(39)	19	(23)	03	(17)	00	(15)	08	(00)
Size of HS Class	00	(-13)	-14	(03)	-11	(00)	00	(-11)	00	(00)

NOTE -- Decimals omitted. Validities for Group B shown in parenthesis.

[1]The N's associated with the various correlations are given in Table 7 for Group A and in Table 8 for Group B.

[a]Sign of correlation reversed to indicate positive relationship of HSR to the criteria.

given in Tables 2 and 3. Mean HSR, which was shown earlier to be moderately well correlated with subsequent achievement, is significantly lower for graduates than non-graduates. Also mean PGPA is significantly higher for graduates. These findings hold for both Group A and Group B. English Placement Total Score is also higher in both groups for graduates. Although the difference is not significant for Group A, the mean aptitude score of graduates in Group B is significantly higher than it is for non-graduates. Again, size of HS class is not different for graduates and non-graduates, although mean units of HS math is greater for graduates. The observed significant differences in achievement between graduates and non-graduates are to be expected.

The achievement data for non-graduates indicate that most of the attrition occurs between the first and third terms. Due to the fact that low-achieving non-graduates drop out of school, an increase in mean GPA is registered for these groups between the first and sixth terms. Presumably most of the 10 students in Group A and the 8 students in Group B still enrolled after six terms will graduate. Also since dropping out of school is not an irrevocable process, a small percentage of the non-graduate drop-outs will eventually graduate.

Regression Analyses

The object of the regression analyses was to select the optimum subset of intellective variables for predicting three achievement criteria: (a) 1st term GPA, (b) 3rd term Cumulative GPA, and (c) 6th term Cumulative GPA. To this end, a series of regression problems were run. All predictor variables were used in the initial run and a program (Borden, 1962) was utilized which successively eliminated, one at a time, the predictor variables which accounted for the least amount of criterion variance. The net result

Table 2

Descriptive Statistics for York Campus Group A[1]
Comparing Graduates with Non-Graduates

Variables	Graduates				Non-Graduates		
	$\bar{X}$	SD	N	t	$\bar{X}$	SD	N
High School Rank	2.73	1.11	95	3.81**	3.35	1.05	86
Engl. Placement	50.98	11.73	95	3.35**	45.02	12.13	86
--Moore-Castore-- Vocab.	43.08	14.01	95	.24	42.58	14.33	86
Para. Read.	23.41	5.25	95	1.79	22.01	5.37	86
Arith.	20.44	4.40	95	1.92	19.14	4.68	86
Algebra	24.74	5.55	95	1.93	23.11	5.80	86
4-pt. Total	111.67	21.25	95	1.42	106.85	23.44	86
PGPA	2.17	.45	74		1.93	.41	56
1st Term GPA	2.48	.57	95	10.00**	1.53	.66	78
3rd Term GPA	2.62	.59	95	10.51**	1.73	.47	45
4th Term GPA	2.76	.56	95	8.66**	1.66	.55	23
4th Term Cum.	2.62	.46	95	10.00**	1.84	.32	24
6th Term GPA	2.76	.59	95	3.30**	2.10	.60	10
6th Term Cum.	2.61	.46	95	5.27**	2.03	.32	10
Units of HS Math	3.15	.87	94	.945	3.03	.77	76
Size of HS Class	142.01	138.25	86	.546	205.61	156.90	70

[1]Group A was formed by combining the entering freshmen classes of 1959 (N = 79), 1960 (N = 60), and 1962 (N = 43).

*p .05

**p .01

Table 3

Descriptive Statistics for York Campus Group B[1]
Comparing Graduates and Non-Graduates

Variables	Graduates			t	Non-Graduates		
	$\bar{X}$	SD	N		$\bar{X}$	SD	N
High School Rank	2.76	.95	62	3.33**	3.26	.84	84
Eng. Pl. 4-pt.	51.40	10.00	62	2.29*	46.45	11.36	84
---Moore-Castore--- Vocab.	46.66	14.08	62	1.41	43.28	12.83	84
Para. Read.	24.71	5.02	62	3.13**	22.38	5.09	84
Arith.	21.76	4.53	62	4.03**	18.77	4.29	84
Algebra	25.77	4.57	62	3.26**	22.94	5.92	84
4-pt.	119.08	20.57	62	5.31**	106.23	22.02	84
PGPA	2.15	.42	56		1.85	.34	79
1st Term GPA	2.58	.63	62	15.24**	1.52	.63	77
3rd Term GPA	2.50	.78	62	7.33**	1.40	.72	40
3rd Term Cum.	2.53	.56	62	8.40**	1.69	.46	40
4th Term GPA	2.77	.55	62	1.04	2.15	.55	10
4th Term Cum.	2.64	.48	62	8.33**	1.89	.21	10
6th Term GPA	2.71	.49	62	2.79**	2.12	.56	8
6th Term Cum.	2.66	.46	62	8.23**	1.97	.17	8
Units of HS Math	3.39	.52	62	3.78**	2.94	.90	81
Size of HS Class	212.03	151.31	62	.404	221.77	128.37	78

[1]Group B was formed by combining the entering freshmen classes of 1961 (N = 80) and 1963 (N = 66).

*p .05
**p .01

of these analyses was the selection of four variables, HSR, M-C Arithmetic, M-C Algebra, and English Placement Total Score, which yielded the optimum prediction of the three achievement criteria. Regression data for predicting 1st term GPA, 3rd term CGPA, and 6th term CGPA, are presented in Tables 4, 5, and 6, respectively.

The obtained multiple correlations for predicting the three criteria are moderately high, ranging between .54 and .60, and compare favorably with those usually found in predicting associate and baccalaureate degree student success (Lindsay & Snyder, 1967). The magnitudes of these multiple correlations are also approximately equal to the zero order correlations obtained between PGPA's, based on regression data from prior associate degree students, and the achievement of the present group of students (See Appendix A and Appendix B). Thus, it appears as if the prediction of associate degree student achievement, using intellective variables, is reliable, and PGPA's may be used with some confidence in making admissions decisions.

Conclusions

Based on the present data, it is quite apparent that intellective variables are useful for predicting subsequent achievement of associate degree students. The correlation and regression analyses showed moderate relationships between past performance (HSR), aptitude, and achievement, and significant differences between these same variables were found when graduates and non-graduates were compared. In fact, it seems reasonable to conclude that aptitude and past performance are more important for associate degree than for baccalaureate degree student success. In a longitudinal study of baccalaureate degree student achievement and attrition, Lindsay & Hamel (1967) found no significant differences in aptitude or high school performance between graduates and non-graduates. Of course it should be pointed out that

Table 4

Predictor and Regression Data for the
Criterion of First Term GPA
(Based on York Campus Group A, N=163)

Independent Variable	$\bar{X}$	SD	Partial r
HSR	3.02	1.12	-.4277
M-C Arith	19.82	4.57	.1365
M-C Alg	23.97	5.70	.2601
Engl Placement	48.13	12.25	.2333
Dependent Variable			
1st Term GPA	2.05	.77	

Summary Data	
Multiple Correlation Coefficient (R)	.6050
Fraction of Explained Criterion Variance	.366
Standard Error of Estimate	.6115

Prediction Equation

Predicted 1st Term GPA = -.26292 (HSR) + .02088 (M-C Arith) + .03183 (M-C Alg)
+ .01279 (Engl Placement) + 1.0546

Table 5

Predictor and Regression Data for the
Criterion of Third Term Cumulative GPA
(Based on York Campus Group A, N=140)

Independent Variable	$\bar{X}$	SD	Partial r
HSR	2.99	1.13	-.5166
M-C Arith	20.29	4.28	.0772
M-C Alg	24.44	5.44	.0964
Engl Placement	48.53	11.91	.1899
Dependent Variable			
3rd Term Cumulative GPA	2.29	.61	

Summary Data	
Multiple Correlation Coefficient (R)	.5870
Fraction of Explained Criterion Variance	.345
Standard Error of Estimate	.4962

Prediction Equation

Predicted 3rd Term Cumulative GPA = -.27203 (HSR) + .00953 (M-C Arith) +
00929 (M-C Alg) + .00837 (Engl Placement) + 2.29353

Table 6

Predictor and Regression Data for the
Criterion of Sixth Term Cumulative GPA
(Based on York Campus Group A, N=105)

Independent Variable	$\bar{X}$	SD	Partial r
HSR	2.80	1.10	-.4876
M-C Arith	20.33	4.41	.2430
M-C Alg	24.64	5.57	-.1515
Engl Placement	50.35	11.55	-.1086
Dependent Variable			
6th Term Cumulative GPA	2.56	.48	

Summary Data	
Multiple Correlation Coefficient (R)	.5425
Fraction of Explained Criterion Variance	.294
Standard Error of Estimate	.4024

Prediction Equation

Predicted 6th Term Cumulative GPA =-.20418 (HSR) + .02498 (M-C Arith) + -.01192 (M-C Alg) + -.00383 (Engl Placement) + 3.14697

associate and baccaluareate degree students are markedly different in terms of their aptitude. For the freshman class of 1966, the mean Scholastic Aptitude Test (SAT) Total Score for associate degree students was 900, whereas the same score for baccalaureate degree students entering science majors was 1143 (Lindsay & Snyder, 1967). Thus, it may be that since baccalaureate degree students are a more select group, aptitude does not assume the importance it does with a less select group. In other words, four-year freshmen as a group probably have at least the minimum aptitude necessary to complete four years of higher education, whereas a larger percentage of two-year freshmen, although their curriculum is assumed to be less demanding, may not have the minimum aptitude.

The implications of the present study for admissions decisions are clear. If the entrance requirements are increased and instructional standards and grading practices remain the same, a higher proportion of entering freshmen should be graduated. While no hard and fast rules can be established, based on the results of one study on one campus in the entire system, it does seem clear that requiring a minimum PGPA of at least 2.00, based on a criterion of third term cumulative GPA, should increase the graduation rate. The mean PGPA, based on a criterion of first term GPA, of all students in the present study was approximately 2.00 with a standard deviation of about .42. This means that about one-half of the entering freshmen had a PGPA of less than 2.00. The five year graduation rate for these students was approximately 48 percent.

If admissions standards are raised, the probability is increased of rejecting applicants who would have graduated if admitted. But on the other hand, the probability of graduation for admitted students is increased. These problems must be faced, however, under any selective admissions system, be it rigorous or non-rigorous. The final decision must be dictated by the philosophy governing admissions policies.

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Appendix A

Table A

Means and Standard Deviations on Selected Variables for the Fall, 1959 Entering Associate Degree Candidates at the York Campus

	High School					Moore-Castore				
	Rank	Units of Math	Size of Class	PGPA	Eng. Place.	Vocab.	Para. Read.	Arith.	Algebra	Total
$\bar{X}$	3.21	2.98	194.88	1.97	46.27	41.37	21.79	19.14	22.81	105.12
SD	1.21	.94	165.33	.44	11.02	13.69	4.84	4.79	5.96	20.81
N	78	72	76	71	78	78	78	78	78	78

Table A--continued

	GPA							Graduated	
	1st term	3rd term	3rd cum	4th term	4th cum	6th term	6th cum	N	%
$\bar{X}$	1.88	2.27	2.18	2.48	2.41	2.70	2.52	39	50
SD	.69	.68	.56	.65	.45	.63	.41		
N	75	59	59	47	47	44	44		
% enrolled	96		76		60		56		

Table B

Means and Standard Deviations on Selected Variables for the Fall, 1960 Entering Associate Degree Candidates at the York Campus

	High School					Moore-Castore				
	Rank	Units of Math	Size of Class	PGPA	Eng. Place.	Vocab.	Para. Read.	Arith.	Algebra	Total
$\bar{X}$	2.68	3.15	194.80	2.18	49.98	42.88	23.25	19.63	24.37	110.13
SD	.94	.74	130.14	.43	12.84	14.76	5.48	4.18	5.20	23.33
N	60	57	59	58	60	60	60	60	60	60

Table B--continued

	GPA								
	1st term	3rd term	3rd cum	4th term	4th cum	6th term	6th cum	Graduated N	Graduated %
$\bar{X}$	2.37	2.43	2.44	2.66	2.57	2.83	2.66	37	61.7
SD	.74	.74	.64	.70	.57	.57	.50		
N	55	51	51	46	46	39	39		
% enrolled	92		85		77		65		

Appendix A

Table C

Means and Standard Deviations on Selected Variables for the Fall, 1961 Entering Associate Degree Candidates at the York Campus

	High School					Moore-Castore				
	Rank	Units of Math	Size of Class	PGPA	Eng. Place.	Vocab.	Para. Read.	Arith.	Algebra	Total
$\bar{X}$	3.02	3.22	225.23	2.04	47.67	42.29	22.86	19.99	23.94	108.12
SD	.87	.75	144.27	.39	10.26	12.60	5.22	4.88	5.29	22.99
N	80	77	74	76	80	80	80	80	80	80

Table C--continued

	GPA								
	1st term	3rd term	3rd cum	4th term	4th cum	6th term	6th cum	Graduated N	Graduated %
$\bar{X}$	2.01	2.06	2.21	2.62	2.49	2.59	2.51	33	41.2
SD	.88	.84	.65	.62	.54	.60	.51		
N	74	58	58	38	38	37	37		
% enrolled	93		73		48		46		

Appendix A

Table D

Means and Standard Deviations on Selected Variables for the Fall, 1962 Entering Associate Degree Candidates at the York Campus

	High School					Moore-Castore				
	Rank	Units of Math	Size of Class	PGPA[a]	Eng. Place.	Vocab.	Para. Read.	Arith.	Algebra	Total
X	3.16	3.23	219.14	-	48.93	45.47	23.77	21.33	25.51	116.07
SD	1.06	.66	107.59	-	12.91	13.52	5.64	4.27	5.38	21.76
N	43	41	21	-	43	43	43	43	43	43

Table D--continued

	GPA							Graduated	
	1st term	3rd term	3rd cum	4th term	4th cum	6th term	6th cum	N	%
X	1.96	2.17	2.22	2.43	2.35	2.54	2.45	19	44.2
SD	.80	.82	.61	.78	.56	.62	.52		
N	43	30	30	26	26	22	22		
% enrolled	100		70		60		51		

[a] Not available for this class.

Table E

Means and Standard Deviations on Selected Variables for the Fall, 1963 Entering Associate Degree Candidates at the York Campus

	High School				Moore-Castore					
	Rank	Units of Math	Size of Class	PGPA	Eng. Place.	Vocab.	Para. Read.	Arith.	Algebra	Total
$\bar{X}$	3.08	3.03	208.64	1.90	49.62	47.67	23.98	20.11	24.39	116.00
SD	.97	.82	129.50	.40	11.76	13.71	5.05	4.25	5.80	20.38
N	66	66	64	59	66	66	66	66	66	66

Table E--continued

	GPA							Graduated	
	1st term	3rd term	3rd cum	4th term	4th cum	6th term	6th cum	N	%
$\bar{X}$	1.97	2.07	2.18	2.75	2.59	2.71	2.65	29	43.9
SD	.75	1.02	.67	.53	.49	.40	.45		
N	65	44	44	31	31	30	30		
% enrolled	98		67		47		45		

Appendix B

Means, Standard Deviations, and Intercorrelations of Selected Variables for York Campus Group A

Variables	1	2	3	4	5	6	7	8	9	Min. N[a]	$\bar{X}$	SD
1. HSR										105	2.80	1.10
2. Arithmetic	-.15									105	20.33	4.41
3. Algebra	-.04	.40								105	24.64	5.58
4. M_C Total	-.15	.57	.58							105	111.48	20.63
5. PGPA	-.57	.53	.40	.84						81	2.16	.43
6. 1st Term GPA	-.44	.34	.35	.32	.49					105	2.42	.58
7. 3rd Term Cum.	-.54	.23	.17	.24	.44	.87				105	2.51	.49
8. 4th Term Cum.	-.54	.22	.03	.09	.28	.78	.96			90	2.48	.50
9. 6th Term GPA	-.40	.16	-.27	-.01	.15	.44	.59	.66		81	2.74	.61
10. 6th Term Cum.	-.49	.22	-.05	.08	.24	.72	.90	.96	.78	81	2.56	.45

Note: The minimally significant r's are: 80df, $r_{.05} = .22$; $r_{.01} = .28$.

[a] Due to attrition over the six term period, the number of students was not constant for all correlations. The N shown is the minimum number on which the statistic was calculated.

Appendix C

Means, Standard Deviations, and Intercorrelations
of Selected Variables for York Campus Group B

Variables	1	2	3	4	5	6	7	8	9	Min. N[a]	$\bar{X}$	SD
1. HSR										67	2.81	.91
2. Arithmetic	-.22									67	21.34	4.51
3. Algebra	-.28	.49								67	25.46	4.36
4. M-C Total	-.07	.58	.50							67	117.15	20.30
5. PGPA	-.44	.59	.52	.74						60	2.11	.40
6. 1st Term GIA	-.35	.58	.55	.53	.63					67	2.48	.69
7. 3rd Term Cum.	-.39	.40	.43	.33	.51	.84				67	2.48	.56
8. 4th Term Cum.	-.44	.44	.45	.35	.64	.83	.98			62	2.53	.53
9. 6th Term GPA	-.15	.30	.12	.22	.38	.42	.60	.69		60	2.63	.55
10. 6th Term Cum.	-.35	.47	.40	.35	.58	.77	.92	.97	.80	60	2.57	.50

Note: The minimally significant r's are: 60 df, $r_{.05} = .25$; $r_{.01} = .32$.

[a] Due to attrition over the six term period, the number of students was not constant for all correlations. The N shown is the minimum number on which the statistic was calculated.